Reference #1

DR. LAWRENCE A. DuBOSE, president
CHARLES C. LUTHER, vice president
LYLE E. THOMPSON, vice president

TESTING SERVICE CORPORATION
457 East Gundersen Drive, Wheaton, Illinois 60187
Telephone: 653-3920 Area Code 312

foundation engineering reports
consultation services
borings — corings
testing and inspection of: concrete
soils
asphalt
foundations

March 31, 1975
L - 12,466

WASTE MANAGEMENT OF ILLINOIS, INC.
P. O. Box 563
Palos Heights, Illinois 60463

Attention: Mr. Robert F. Peterson,
Regional Engineer

Re: Subsoil Investigation for
Tri-County Landfill
South Elgin, Illinois

Gentlemen:

We have completed eight of the nine soil borings for the above referenced project at locations and depths as directed by your representative. Boring 7 was not drilled due to accessibility problems. A Boring Location Plan has been prepared and is included with this correspondence.

These borings were made using a drill rig mounted on an All-Terrain Vehicle with the bore holes being advanced by hollow stem auger methods. The samples were taken by Split Spoon methods in accordance with currently recommended ASTM Procedures.

Laboratory testing consisted of water content determinations and unconfined compression strength measurements along with pocket penetrometer readings for cohesive samples in addition to the permeability tests and grain size analysis. The soils were examined by one of our engineers and classified in accordance with the Unified Classification System. The results of the field and laboratory work with the exception of the permeability and grain size determinations are shown on the Boring Logs included with this report.

Ground surface elevations for the borings were referenced to sea level for a given benchmark as shown on the Boring Location Plan. Water level observations were made during and at the end of the drilling operations as well as 24 hours and 7 days after completion. The holes were then sealed with cement grout.

Soil conditions showed some variation over the site. Borings 1 and 2 showed granular soils existing to a depth of 23 feet for both boring locations. Below this to the bottom of the borings at 70 feet, silty CLAYS were sampled ranging from a tough to hard condition.

Borings 3 and 4 showed mostly silts, clayey silts and sands and gravels to a depth of 48 and 42 feet respectively. A 5-foot layer of hard silty CLAY was sampled at Boring 3 from 38 to 42 feet. Below these materials to the bottom of the borings at 70 feet, silty CLAYS in a tough to hard condition were sampled.

At Borings 5 and 6 below the topsoil and sand at 8 and 3.5 feet respectively, silty CLAYS in a tough to hard condition were sampled to the bottom of the borings at 70 feet.

At Boring 8 below the topsoil, clayey SILT was sampled to a depth of 12 feet. Below this, tough to very tough silty CLAY was sampled to a depth of 19.5 feet. Sand and gravel was then encountered to a depth of 34.5 feet. Below this very tough to hard silty CLAY was sampled to a depth of 68 feet. Two feet of very tough sandy CLAY was encountered below this to the bottom of the boring at 70 feet.

Boring 9 showed generally granular and intermediate soils consisting of silty sand, clayey silt, silt and sand to the end of the boring at 70 feet. The exception was a 15-foot layer of very tough to hard silty CLAY encountered from 23 to 38 feet.

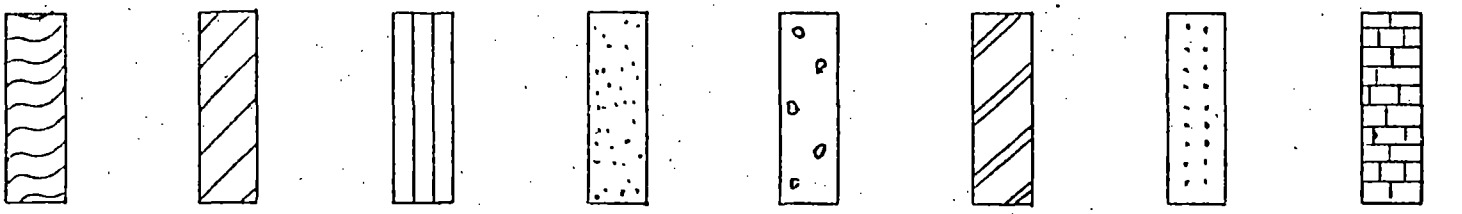
Permeability tests were performed on three samples representative of the silty clays encountered. The following results were obtained:

BORING	SAMPLE	DEPTH IN FEET	COEFFICIENT OF PERMEABILITY IN CM/SEC	SOIL DESCRIPTION & CLASSIFICATION
2	10	48.5 - 50.0	2.0×10^{-8}	Brownish-gray silty CLAY, little sand and gravel (CL)
5	7	33.5 - 35.0	3.2×10^{-8}	Grayish-brown silty CLAY, little sand and gravel (CL)
9	6	28.5 - 30.0	6.7×10^{-8}	Gray silty CLAY, trace sand and gravel (CL)

The silty clays encountered can be considered as impervious for all practical purposes as represented by the above data.

TESTING SERVICE CORPORATION

LEGEND FOR BORING LOGS



PEAT and ORGANIC SOIL | CLAY | SILT | SAND | GRAVEL | SHALE | SANDSTONE | LIMESTONE

ST = Shelby Tube Sample SS = Split Spoon Sample γ_{dry} = Dry unit weight in pounds per cubic foot

A = Auger Sample WC = In situ water content

N = Penetration Resistance in Blows per Foot - by driving 2" O.D. Split Spoon Sampler a distance of 12 inches with a 140-pound weight freely falling 30 inches

▽ = water level at end of boring ▼ = water level after elapsed time interval

Q_u = Unconfined compression strength in Tons per Square Foot

* = Denotes strength was based on pocket penetrometer measurements. Maximum range = 5.0

MATERIAL	SIZE RANGE
BOULDER	Over 8 inches
COBBLE	8 inches to 2-1/2 inches
Coarse GRAVEL	2-1/2 inches to 1 inch
Medium GRAVEL	1 inch to 3/8 inch
Small GRAVEL	3/8 inch to No. 4 sieve
Coarse SAND	No. 4 sieve to No. 20 sieve
Medium SAND	No. 20 sieve to No. 60 sieve
Fine SAND	No. 60 sieve to No. 200 sieve
SILT or CLAY	Finer than No. 200 sieve

COHESIVE SOILS (over 30 per cent CLAY by weight)

Classification	Q_u
Very Soft	0.35
Soft	0.35 to 0.59
Stiff	0.60 to 0.99
Tough	1.00 to 1.99
Very Tough	2.00 to 3.99
Hard	4.00 and over

Term	Per Cent by Weight
CLAY	over 50 (no modifiers)
CLAY	30 to 50 (modifier - Silty, Sandy, Gravelly)

COHESIONLESS SOILS (less than 30 per cent CLAY by weight)

Classification	N
Very Loose	0 - 4
Loose	5 - 9
Firm	10 - 29
Dense	30 - 49
Very Dense	50 and over

Term	Per Cent by Weight
SILT, SAND or GRAVEL	Major portion (with modifier)
Silty, Sandy, Gravelly	35 to 50
Clayey	20 to 30

Modifying Term	Per Cent by Weight
Trace	1 - 10
Little	10 - 20
Some	20 - 35
And	35 - 50

APPENDIX "F"

GROUND WATER CONDITIONS

The dolomitic bedrock is jointed and creviced. Typically, these openings, along with the pervious sand and gravel lying immediately over the bedrock, are filled with water and constitute a valuable source referred to herein as the Silurian aquifer. Although the piezometric surface of this aquifer in some areas within this site extends well above the base of the clay-till, we believe the clay-till to function as an aquitard relative to perched water located above the clay-till.

The perched water condition exists typically in the relatively pervious surficial sands, gravels and silty sands, overlying the relatively impervious silty clay-tills. Marshy land located to the north of the site seems to evidence this perched water in low areas and depressions, and in the creek itself which flows to the southwest as shown in the drawings. Also, the perched water condition is evidenced in the numerous undrained pockets within the area where sands and gravels were stripped from the surface. The piezometric level of this perched water table was found to be locally above the local piezometric level of the Silurian water table. The continuity of the aquitard is also evidenced by the borings.

This upper water has not, to our knowledge, been utilized as a source of potable water for human or animal use. Some contamination of this perched water associated with the application of fertilizers and the cattle feeding operations just north of the site is to be expected.